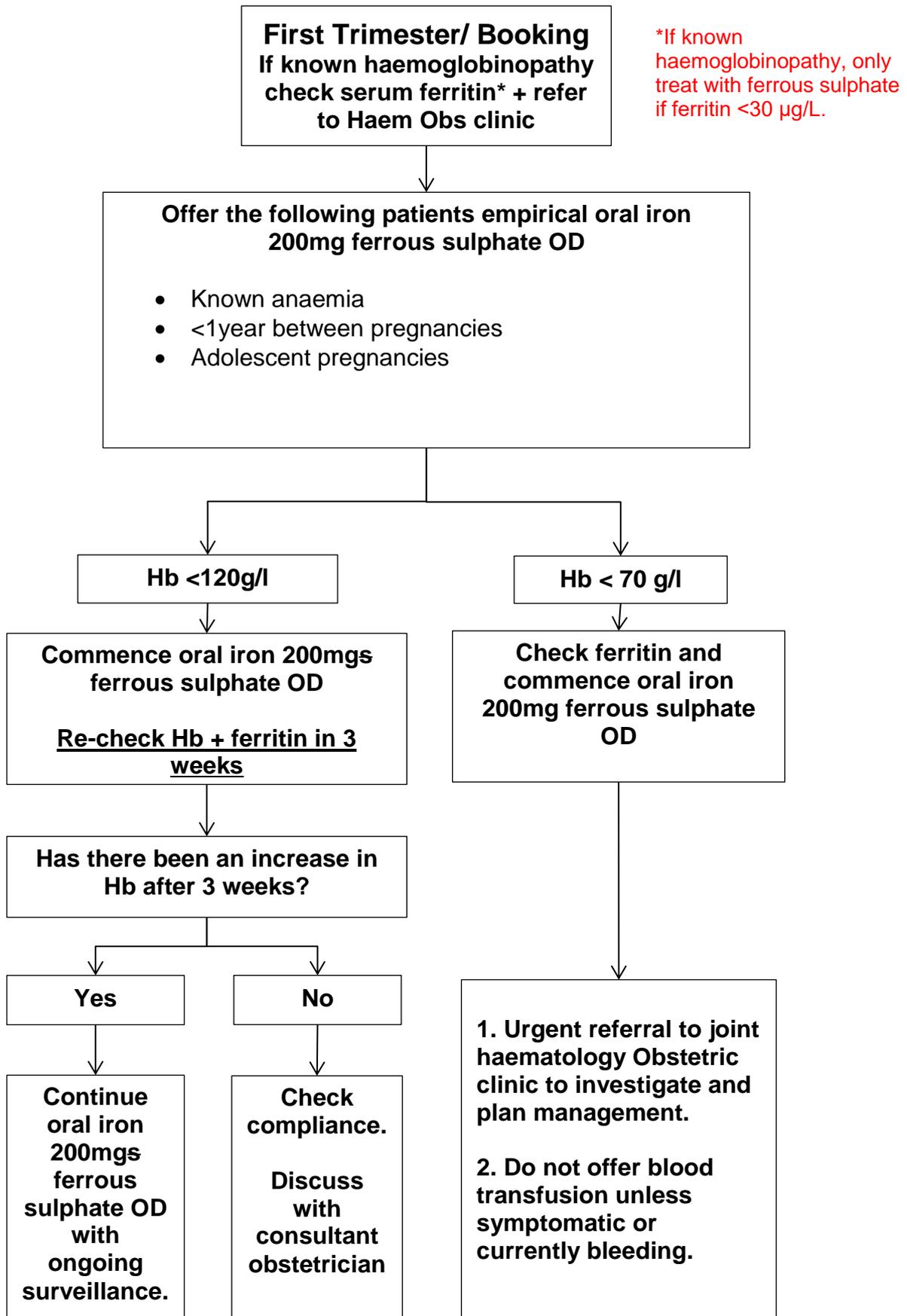


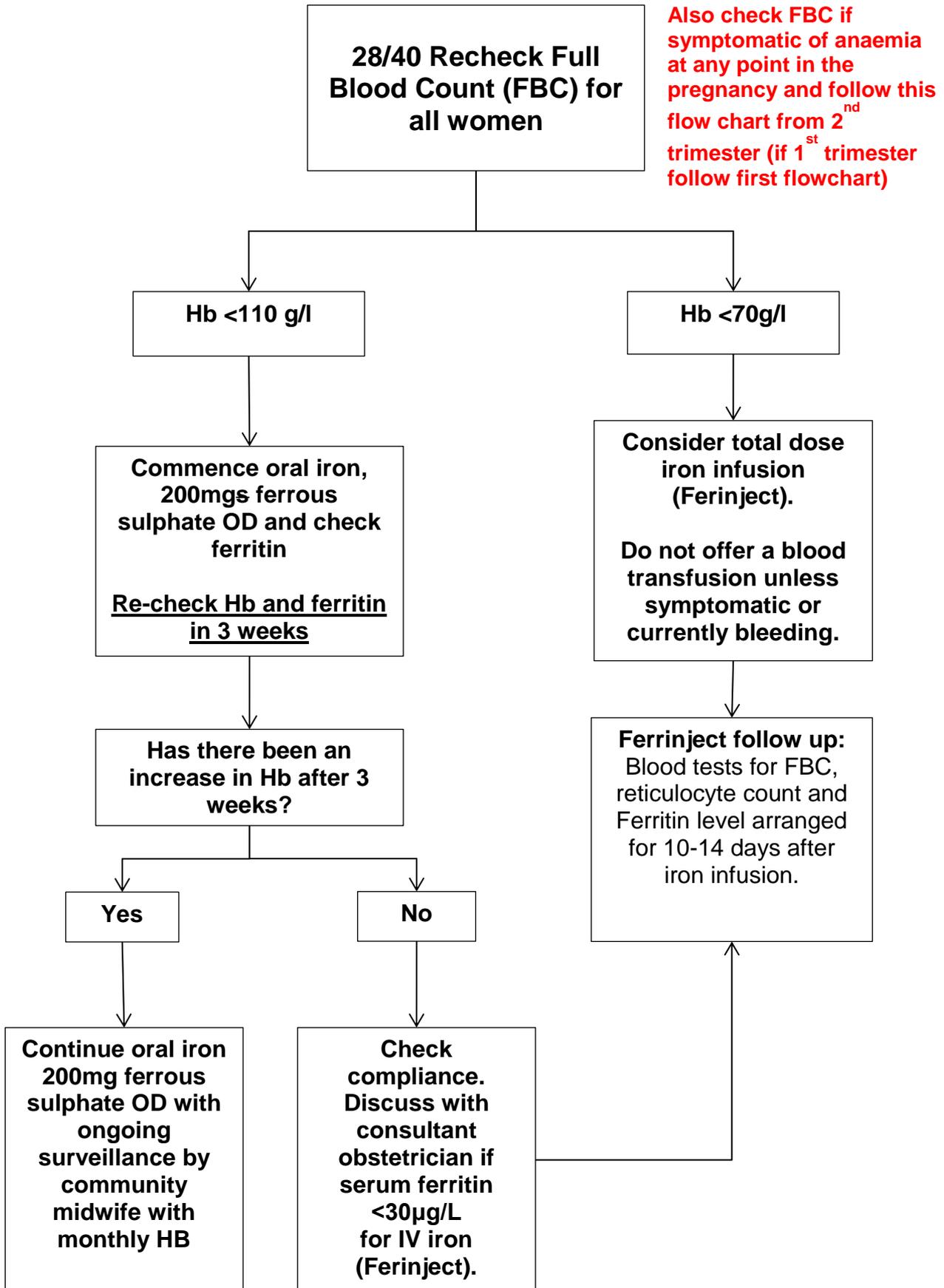
Anaemia: Diagnosis and Treatment throughout Pregnancy, Labour and Post-Partum Period Clinical Guideline

V3.0

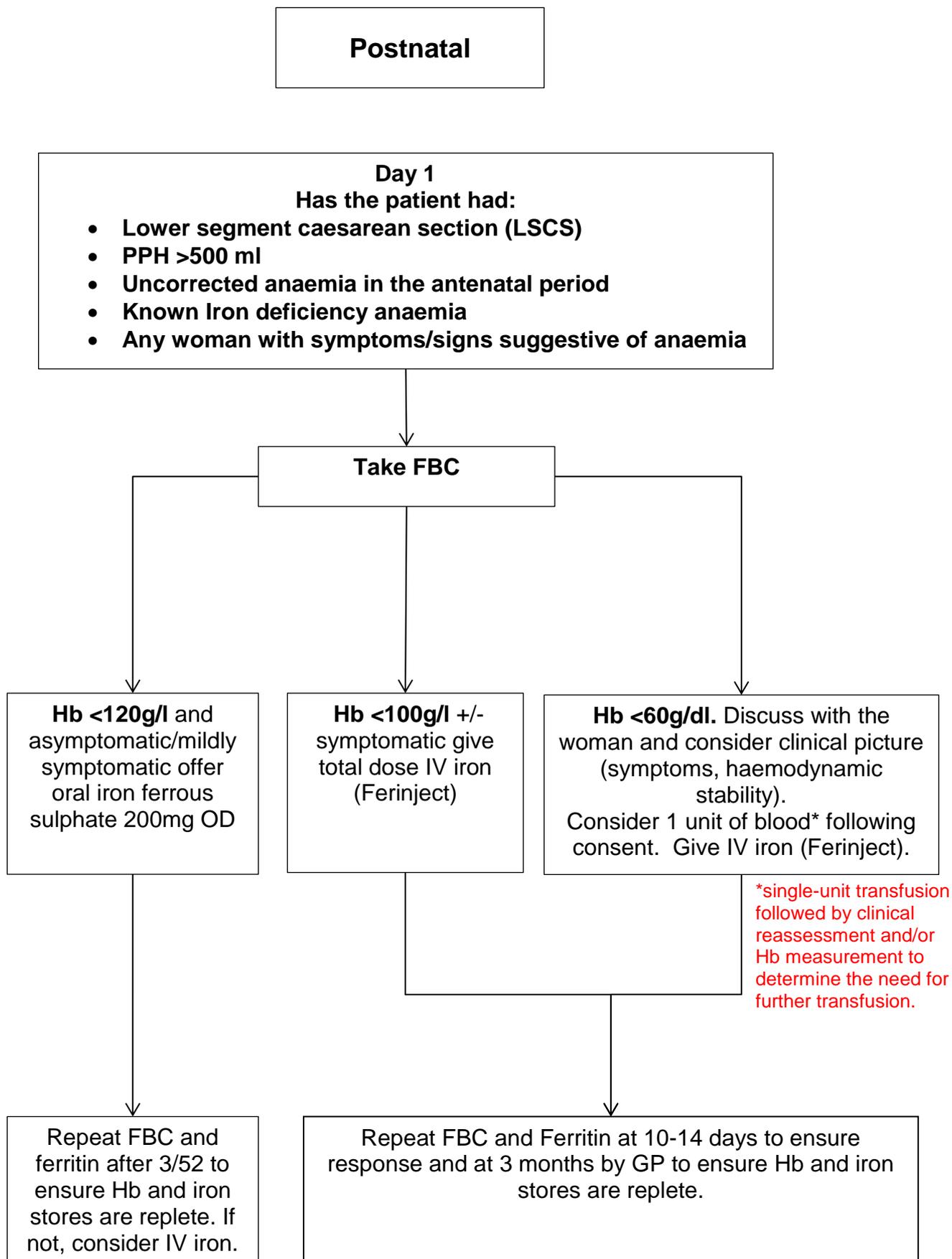
July 2021



Summary – Anaemia at 28 weeks



Summary – Anaemia Postnatal



1. Aim/Purpose of this Guideline

- 1.1. The objective of this guideline is to provide health care professionals with clear and simple recommendations for the diagnosis and treatment of iron deficiency in pregnancy and the postpartum period.
- 1.2. The guideline gives the procedure for the administration of total dose iron.
- 1.3. This version supersedes any previous versions of this document.
- 1.4. This guideline makes recommendations for women and people who are pregnant. For simplicity of language the guideline uses the term women throughout, but this should be taken to also include people who do not identify as women but who are pregnant, in labour and in the postnatal period. When discussing with a person who does not identify as a woman please ask them their preferred pronouns and then ensure this is clearly documented in their notes to inform all health care professionals.

Data Protection Act 2018 (General Data Protection Regulation – GDPR) Legislation

The Trust has a duty under the DPA18 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed and documented. We cannot rely on opt out, it must be opt in.

DPA18 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the DPA18 please see the *Information Use Framework Policy* or contact the Information Governance Team rch-tr.infogov@nhs.net

2. The Guidance

2.1. Introduction

- 2.1.1. Anaemia is common in pregnancy and is associated with adverse outcomes but it is possible to identify and treat it prior to childbirth. In the UK, over 90% of women who are anaemic in pregnancy have iron deficiency anaemia (IDA). IDA remains a significant problem in the developed world; an estimated 30-40% of pregnant women have iron depletion (WHO 2008) as iron stores are often insufficient to meet the increasing demands of pregnancy. Iron deficiency is already advanced by the time anaemia is detected and has consequences even when anaemia is not clinically apparent.
- 2.1.2. **Without supplementation, 80% of women at term will have no detectable iron stores and it will take 2 years of normal dietary iron to replace the iron lost with each pregnancy (De Leeuw et al., 1966).**

- 2.1.3. Effective management of this anaemia is essential to prevent adverse maternal and fetal outcome, and will reduce the need for allogeneic red cell transfusion. Blood transfusions entail a number of known risks (e.g. transmission of infectious agents, transfusion reactions, ABO mismatch, transfusion-related acute lung injury, transfusion-associated circulatory overload, etc.) and lesser known consequences such as immunomodulation (increased incidence of infections and cancer recurrence) (Goodnough & Shander, 2012).
- 2.1.4. In IDA there is shortage of iron stores (low ferritin; iron depletion reduces iron availability for red cell production, resulting in decreased haemoglobin (Hb) and oxygen delivery to tissues.
- 2.1.5. The effects of IDA on the pregnant woman may include increased susceptibility to infections, physical weakness, preterm labour, PPH, postnatal depression, low birth weight babies. The fetus is relatively protected from the effects of iron deficiency, although neonatal anaemia and impaired psychomotor development have been described. There is little information regarding the Hb threshold below which mortality increases, although this may be as high as 89 g/l, which is associated with a doubling of the maternal death risk in Britain (Brabin et al, 2001).

2.2. Definitions

2.2.1 Definition of anaemia as per the World Health Organisation (WHO)

Anaemia in pregnancy is defined by:

- Hb <110g/l in first trimester,
- Hb <105g/l in second / third trimester (allowing for physiological haemodilution)
- Hb <100g/l in postpartum period (British Committee for Standards in Hematology, BCSH 2019)

2.2.2 Definition of optimal haemoglobin level

The current WHO guidelines are outdated and under review. It is recognized that iron deficiency will be present before anaemia is detectable on a full blood count. This carries a significant symptom burden and is associated with negative outcomes for mother and baby. For these reasons, women with **Hb >110g/L** at delivery should be considered to have an optimal haemoglobin.

2.3 Diagnosis of iron deficiency

2.3.1. Clinical symptoms and signs

Since iron is an essential element in all cells, symptoms of iron deficiency can occur before a fall in Hb. Usually the symptoms and signs are non-specific. Fatigue is the most common symptom; others include weakness, headache, palpitation, dizziness, dyspnoea, poor concentration, hair loss, irritability, depression and increased frequency of infections.

- 2.3.2. In the post-partum period, symptoms include decreased physical performance (tiredness, breathlessness, palpitations), increased risk of infection (urinary tract), impaired lactation, reduced cognitive abilities, emotional instability and depression (Bergmann et al., 2010). Mother–child interactions are affected as women experience difficulties in caring for their newborn, which compromises the emotional bonds between the mother and baby (Perez et al., 2005).
- 2.3.3. **Lab tests**
FBC (Full Blood Count): Hb below 120g/L indicates anaemia. There is often a low MCV (microcytic), low MCH (hypochromic) anaemia with iron deficiency, although microcytic hypochromic anaemia can also indicate haemoglobinopathies.
- 2.3.4. **Serum ferritin**
This is the first laboratory test to become abnormal in iron deficiency and is the most useful and easily available parameter for assessing iron deficiency (< 30 microgm/l). Other tests like serum iron, total iron binding capacity lack sensitivity and specificity and hence are not recommended in routine diagnosis.
- 2.3.5. **Trial of oral iron**
A trial of oral therapy is simultaneously diagnostic and therapeutic. If haemoglobinopathy status is unknown it is reasonable to start oral iron whilst screening is being performed. A trial of oral iron should demonstrate a rise in Hb by 2-3 weeks and confirms iron deficiency. If oral iron is poorly tolerated, trial alternate day dosing. This may be successful as there may be less increase in maternal hepcidin levels which can happen with consecutive day dosing. If there has been no improvement in Hb in 2 -3 weeks referral should be made to secondary care to consider other causes of anaemia. Take folate and B12 bloods prior to referral.
- 2.3.6. **Haemoglobinopathy**
If the woman is known to have haemoglobinopathy, ferritin should be checked first and iron started only if ferritin is < 30 ugm/l.

2.4. Management of iron deficiency

- 2.4.1. **Antenatal**
FBC is routinely checked at booking and 28 weeks, but should be carried out at any point in pregnancy if a patient is symptomatic of anaemia.
- 2.4.2. **Booking**
If the Hb at booking is <120g/L: Start on trial of oral Iron: Ferrous Sulphate 200mg OD taken on an empty stomach, 1 hour before meals with a source of vitamin C such as orange juice (to increase absorption). Other medications or antacids, tea or coffee should not be taken at the same time.

- 2.4.2.1. Patients should be warned of the potential gastrointestinal side-effects associated with oral iron (abdominal pain, nausea, vomiting, diarrhoea and dark stools) which may be reduced by taking after food (which will reduce absorption) or by decreasing the dose.
- 2.4.2.2. Consider alternate day dosing (Ferrous sulphate 200mg) in women who are struggling to tolerate oral iron due to gastrointestinal side effects.
- 2.4.2.3. Repeat Hb and ferritin levels 3 weeks after commencement of iron therapy (15-16 week appointment) and a rise in Hb should be demonstrated. If there is no rise in Hb despite good compliance, refer to a Consultant Obstetrician for investigation.
- 2.4.2.4. **Hb <70g/l**: Urgent referral to joint haematology Obstetric clinic to investigate and plan management. Do not offer blood transfusion unless symptomatic or currently bleeding.

NB: Serum ferritin should be checked prior to starting oral iron in patients with known haemoglobinopathy.

2.4.3. **28 week appointment.** Recheck FBC for all women.

- 2.4.3.1. **Hb <110g/l: trial of oral iron as above** and check for response in 3 weeks. If no response in 3 weeks check serum ferritin and refer to Consultant Obstetrician to consider total dose IV iron (Ferinject).
- 2.4.3.2. **Hb <70g/l**: Urgent referral to joint Haematology Obstetric Clinic to investigate and plan management. Do not offer blood transfusion unless symptomatic or currently bleeding. Consider total dose Iron infusion (Appendix 3).

2.4.4. **Postnatal anaemia**

- 2.4.4.1. **Hb >120g/L should be considered an optimal haemoglobin level.**
- 2.4.4.2. **Check FBC on day 1**
- For all women who have had a LSCS.
 - PPH of more than 500ml
 - Uncorrected anaemia in the antenatal period
 - Known iron deficiency anaemia
 - Any woman with symptoms/signs suggestive of anaemia
- 2.4.4.3. **Hb 100-120g** and asymptomatic and haemodynamically stable should be offered oral iron (Ferrous Sulphate 200mg OD) for 3 months. Advise the woman to have a repeat FBC and ferritin after 3 weeks to ensure Hb and iron stores are replete. Women

who have had a caesarean section are less likely to absorb oral iron as their hepcidin levels will be higher (caused by inflammatory response to surgery). Consider IV iron as an alternative in these women.

2.4.4.4. **Hb <100g/l:** Treat with total dose intravenous Iron (i.e. Ferinject)-Repeat FBC and ferritin at 10-14 days to ensure response and at 3 months by GP, to ensure Hb and iron stores are replete.

2.4.4.5. **Hb <60g/l:** Discuss options with woman. Also depends on clinical picture (symptoms, signs, haemodynamic instability). Consider 1 unit of blood following informed consent (this should be a single-unit transfusion with a repeat Hb to determine the need for further transfusion) and/or total dose IV Iron (i.e. Ferinject).

*One red cell concentrate contains approximately 240 mg of iron, which is insufficient to replenish iron reserves. Therefore, concomitant IV iron to replete the iron reserves in order to minimise the number of transfusions should be considered.

2.4.5. **Symptomatic Anaemia**

Women who are symptomatic of anaemia, haemodynamically unstable or continuing to bleed heavily will need a full senior obstetric review to investigate the origin of the blood loss and decide further management. Other speciality involvement may be indicated.

Follow up arrangements with primary care should be ensured at postnatal discharge from hospital.

2.5. **Management of labour and delivery in woman with iron deficiency**

With good practice this situation should be generally avoided, however there are instances when women book late, have not engaged in antenatal care, or moved from out of the county. In such situations take all measures to minimise blood loss at delivery.

2.5.1. Deliver in hospital with IV access, and FBC and group and screen on admission

2.5.2. Active management of third stage (refer to guidelines in management of third stage 2012)

2.5.3. Consider prophylactic Syntocinon infusion / Misoprostol (Alfirevic 2007)

2.5.4. In the event of a PPH, there will be a tendency to decompensate quicker, so all measures to stop bleeding should be performed promptly

2.5.5. Post-natal FBC day 1 and iron replenishment as above

2.6. **Parenteral Iron therapy**

- 2.6.1. Is proven to increase Hb faster than oral iron and replenish iron stores faster when compared with oral iron therapy (Bhandal 2005, Wyk 2007, Breyman 2007).
- 2.6.2. Fewer postpartum blood transfusions are reported in a large group treated with IV iron antenatally (Reveiz 2007).
- 2.6.3. **Ferinject** is an intravenous total dose iron preparation providing slow release of bio available iron for uptake by the reticuloendothelial cells and little risk of release of free iron. Hence there is no need for a test dose.
- 2.6.4. An erythropoietic response is seen in a **few days** with an increase in reticulocyte count and ferritin level (iron store) returns to normal **in 1-2 weeks**.
- 2.6.5. Doses of up to 1000mg iron can be administered in a single infusion. **MAXIMUM DOSE IS 1000MG PER WEEK.**

2.7. Contraindication

2.7.1. **PREVIOUS HYPERSENSITIVITY TO IV IRON**

- 2.7.2. Acute infection/ inflammation
- 2.7.3. First trimester of pregnancy

2.8. **Total dose IV Iron** – Ferrinject 1000mg in 20ml vial for slow IV infusion. (Unless body weight <35kg, then dose = 500mg)

- 2.8.1. Antenatal infusion is based on Consultant decision
- 2.8.2. A serum Ferritin < 30 micrograms/l is confirmation of iron deficiency anaemia
- 2.8.3. If in community refer to DAU for infusion
- 2.8.4. Administer according to prescription
- 2.8.5. Postnatal infusions will take place either on delivery suite or Wheel Fortune, or if referred, in DAU
- 2.8.6. Administer total dose iron (i.e. Ferinject) according to protocol, (Appendix 3&4)
- 2.8.7. **A test dose is NOT required for total dose iron preparations.** Risk of anaphylaxis - 1 in 10,000 cases (0.01%).
- 2.8.8. Other uncommon side effects include fast pulse, low BP and feeling dizzy.

2.9. FERINJECT

- 2.9.1. Make up single dose infusion 1000mg/1 vial of Ferinject diluted with 250ml 0.9% saline via infusion at 500mls/hr over 30minutes.
- 2.9.2. Administer as per Appendix 4&5.
- 2.9.3. Re-check Hb and serum ferritin 10-14 days after IV Iron dose.
- 2.9.4. Expected outcome = increase Hb of as much as 20g/l in 5-7 days, 30-40g/l after 2 weeks.

3. Monitoring compliance and effectiveness

Element to be monitored	<ol style="list-style-type: none">1. Haemoglobin at booking is measured and 28 weeks2. The diagnosis of anaemia is made if Hb is <120 at booking3. The diagnosis of anaemia is made if Hb is <110 at 28 weeks4. Haemoglobin measurements are reviewed and treated within 2 weeks5. Once iron is commenced the Hb and ferritin should be reviewed within 4 weeks6. After 34 weeks with iron deficiency anaemia should be referred for secondary care review
Lead	Sophie Haynes, Consultant Obstetrician
Tool	Elements to be monitored will be recorded on an Excel document
Frequency	Once in the lifetime of the guideline
Reporting arrangements	Audit meetings and forum
Acting on recommendations and Lead(s)	Forum and Audit meetings for maternity
Change in practice and lessons to be shared	Via team leaders and audit team dissemination

4. Equality and Diversity

- 4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the ['Equality, Inclusion & Human Rights Policy'](#) or the [Equality and Diversity website](#).
- 4.2. Equality Impact Assessment
The Initial Equality Impact Assessment Screening Form is at Appendix 2.

Appendix 1. Governance Information

Document Title	Anaemia: Diagnosis and Treatment throughout Pregnancy, Labour and Post-Partum Period Clinical Guideline V3.0		
This document replaces (exact title of previous version):	Anaemia: Diagnosis and Treatment throughout Pregnancy, Labour and Post-Partum Period Clinical Guideline V2.0		
Date Issued/Approved:	July 2021		
Date Valid From:	July 2021		
Date Valid To:	July 2024		
Directorate / Department responsible (author/owner):	Dr Sophie Haynes, Consultant Obstetrician Dr Katharine Sprigge, Consultant Anaesthetist		
Contact details:	01872 252729		
Brief summary of contents	The objective of this guideline is to provide health care professionals with clear and simple recommendations for the diagnosis and treatment of iron deficiency in pregnancy, labour and the postpartum period. The guideline gives the procedure for the administration of total dose iron.		
Suggested Keywords:	Anaemia, pregnancy, labour, postnatal period, postpartum, iron infusion, labour, FBC, Hb, Ferrinject, iron		
Target Audience	RCHT ✓	CFT	KCCG
Executive Director responsible for Policy:	Medical Director		
Approval route (names of committees)/consultation:	Maternity Guidelines Group Obstetrics and Gynaecology Directorate Care Group Board		
Care Group General Manager confirming approval processes	Mary Baulch		
Name of Governance Lead confirming approval by specialty and divisional management meetings	Caroline Amukusana		
Publication Location (refer to Policy on Policies – Approvals and Ratification):	Internet & Intranet	✓	Intranet Only
Document Library Folder/Sub Folder	Clinical / Midwifery and Obstetrics		
Links to key external standards	N/A		

<p>Related Documents:</p>	<ul style="list-style-type: none"> • Defining perioperative anaemia in women: challenging the status quo. Ferguson & Dennis. Anaesthesia 2019; 74; 237-245 • UK Guidelines on the Management of Iron Deficiency in Pregnancy. Pavord et al. BJH 2020;188; 819-830 • UK guideline on the management of iron deficiency in pregnancy, BCSH, July 2011 Bayoumeu F, Subiran-Buisset C, Baka NE, Legagneur H, Monnier-Barbarino P, Laxenaire MC. • Iron therapy in iron deficiency anaemia in pregnancy: intravenous route versus oral route. Am J Obstet Gynecol. 2002;186:518-522 Brabin, B.J., Hakimi,M., Pelletier,D. (2001) • An analysis of anaemia and pregnancy related maternal mortality. Journal of Nutrition 131, 604S- 615S Bhandal N, Russell R. • Intravenous versus oral iron therapy for postpartum anaemia. BJOG 2006; 113:1248-1252 Gravier A, Descargues G, Marpeau L. • How to avoid transfusion in the post-partum period: importance of an intravenous iron supplement]. J Gynecol Obstet Biol Reprod (Paris). 1999;28:77-78 • Hand book of Obstetric Medicine, second edition, Catherine Nelson Piercy • M. Muñoz et al. Patient blood management in obstetrics: management of anaemia and haematinic deficiencies in pregnancy and in the post-partum period: NATA consensus statement. Transfus Med 2018;28:22–39. • Summary of product characteristics – Ferrous Sulphate Jul 2018 • Summary of product characteristics- Ferinject (Ferric Carboxymaltose) Dec 2018
<p>Training Need Identified?</p>	<p>No</p>

Version Control Table

Date	Version No	Summary of Changes	Changes Made by (Name and Job Title)
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October 2010	1.0	Initial document	Dr Aylur Rajasri Consultant Obstetrician
October 2012	1.1	Change in product from Venofer to Monofer and change in management of HB ,11 at booking and <10.5 at 28 weeks	Dr Aylur Rajasri Consultant Obstetrician
6 th February 2014	1.2	Change in product name from Monofer to Ferinject only	Dr Aylur Rajasri Consultant Obstetrician
12 th January 2017	1.3	Ferinject vial changed to 500 mg in 10 ml	Dr Aylur Rajasri Consultant Obstetrician
December 2019	2.0	Ferinject + ferrous sulphate dosing adjusted Flow charts simplified to improve compliance	Dr Emma Shephard O&G ST2, Dr Cathy Ralph Consultant Anaesthetist
July 2021	3.0	Complete version update. Thresholds (g/L) for commencing iron therapy updated throughout.	Dr Katharine Sprigge, Consultant Anaesthetist

All or part of this document can be released under the Freedom of Information Act 2000

This document is to be retained for 10 years from the date of expiry.
This document is only valid on the day of printing

Controlled Document

This document has been created following the Royal Cornwall Hospitals NHS Trust Policy for the Development and Management of Knowledge, Procedural and Web Documents (The Policy on Policies). It should not be altered in any way without the express permission of the author or their Line Manager.

Appendix 2. Initial Equality Impact Assessment

Section 1: Equality Impact Assessment Form						
Name of the strategy / policy / proposal / service function to be assessed Anaemia: Diagnosis and Treatment throughout Pregnancy, Labour and Post-Partum Period Clinical Guideline V3.0						
Directorate and service area: Obstetrics and Gynaecology Care Group			New or existing document: Existing			
Name of individual completing assessment: Rachel Mullins			Telephone: 01872 255019			
1. Policy Aim* <i>Who is the strategy / policy / proposal / service function aimed at?</i>		The objective of this guideline is to provide health care professionals with clear and simple recommendations for the diagnosis and treatment of iron deficiency in pregnancy, labour and the postpartum period. The guideline gives the procedure for the administration of total dose iron.				
2. Policy Objectives*		Ensure timely identification and treatment of pregnant women/newly delivered women with anaemia.				
3. Policy – intended Outcomes*		Prevention and treatment of anaemia in pregnancy and post-natal period.				
4. *How will you measure the outcome?		Compliance Monitoring Tool.				
5. Who is intended to benefit from the policy?		Pregnant and newly delivered women with iron deficiency anaemia.				
6a Who did you consult with		Workforce	Patients	Local groups	External organisations	Other
		x				
b). Please identify the groups who have been consulted about this procedure.		Maternity Guidelines Meeting PRG				
What was the outcome of the consultation?		Agreed				

7. The Impact

Please complete the following table. **If you are unsure/don't know if there is a negative impact you need to repeat the consultation step.**

Are there concerns that the policy could have differential impact on:				
Equality Strands:	Yes	No	Unsure	Rationale for Assessment / Existing Evidence
Age		X		
Sex (male, female, trans-gender / gender reassignment)		X		
Race / Ethnic communities /groups		X		
Disability - Learning disability, physical impairment, sensory impairment, mental health conditions and some long term health conditions.		X		
Religion / other beliefs		X		
Marriage and Civil partnership		X		
Pregnancy and maternity		X		
Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian		X		
<p>If all characteristics are ticked 'no', and this is not a major working or service change, you can end the assessment here as long as you have a robust rationale in place.</p> <p>I am confident that section 2 of this EIA does not need completing as there are no highlighted risks of negative impact occurring because of this policy.</p>				
Name of person confirming result of initial impact assessment:			Julie Walton (Audit midwife)	
<p>If you have ticked 'yes' to any characteristic above OR this is a major working or service change, you will need to complete section 2 of the EIA form available here:</p> <p>Section 2. Full Equality Analysis</p> <p>For guidance please refer to the Equality Impact Assessments Policy (available from the document library) or contact the Human Rights, Equality and Inclusion Lead</p> <p>india.bundock@nhs.net</p>				

Appendix 3

Ferinject Administration

10 mL vial = 500 mg ****ONLY IF BODY WEIGHT <35kg****

20 mL vial = 1,000 mg

- Dilute ferrinject dose:
 - For 500mg dose, dilute 10mL in 100mL of 0.9% IV sodium chloride
 - For 1,000mg dose, dilute 20mL in 250mL of 0.9% IV sodium chloride
- Label
- Switch on Baxter pump and allow it to undertake its self check
- Press “OPEN” and load Baxter administration set. Once loaded it will close automatically
- Select “new patient”
- Select “Primary” administration
- Administer over 30 mins:
 - set rate at 200 mls per hour for 500mg dose,
 - set rate at 500mls per hour for 1,000mg dose.
- Fully open flow-regulating clamp on administration set and press start
 - **Test Dose is Not Required**
- Observations (BP, HR, RR and saturation) are required prior to the start of the infusion and every 15 mins for the duration of the infusion. (See appendix 4)

Patients must stay for 30 mins following infusion and observations checked prior to discharge.

If hypersensitivity reactions or signs of intolerance occur during administration, the treatment must be stopped immediately.

- If the patient and their observations are all within normal limits the cannula can be removed and the patient discharged

Any problems please contact Blood Conservation on 8079

Appendix 4

Checklist for Total Dose Iron Infusion in Maternity

Date: / /

Location:

DAU / Wheal Rose / Delivery Suite / Wheal Fortune

Patient Identity Label

	Name & signature
Antenatal patient at weeks gestation / Postnatal patient Patient information leaflet on IV iron given Verbal consent obtained	
Antenatal infusion is based on Consultant decision Consultant authorising iron infusion:	
Ferritin level: <30 / Hb<80 gm%/ proven gastric intolerance to oral iron Diagnosis of iron deficiency documented in notes	
Contraindication to parental iron therapy: <ul style="list-style-type: none"> • Previous hypersensitivity to IV iron • Acute / Infection / inflammation • First trimester of pregnancy No contradiction to IV iron for this patient	
Maternal observations prior to commencing iron infusion Temp: BP: / Pulse: Sp O2: % Resps: Fetal heart rate: bpm	
Iron Infusion 1000mg Ferinject in 250mL 0.9% saline (or 500mg Ferinject in 100mL 0.9% saline) Commence infusion via Baxter pump – 30 minutes infusion <ul style="list-style-type: none"> - 500mg dose = 200mL per hour / Volume 100mL - 1000mg dose = 500mL per hour / Volume 250mL - Test dose NOT required 	
Maternal observations after 15 minutes infusion Temp: BP: / Pulse: Sp O2: % Resps: Fetal heart rate	
Maternal observations after infusion complete Temp: BP: / Pulse: Sp O2: % Resps: Patient observed for 30 minutes after infusion complete Fetal well being CTG performed	
Cannula flushed with 8mls 0.9% saline. Cannula removed and cannula care plan completed	
Patient informed of possible side effects and advised to ensure an adult is with them overnight	
Follow up. Blood tests for FBC, reticulocyte count and Ferritin level arranged for 10-14 days after iron infusion. Blood forms given to patient with clear instruction.	

Please refer to RCHT Clinical Guideline: Anaemia: Diagnosis and treatment of anaemia throughout pregnancy, labour and postpartum period